What is claimed is:

1. A probe for measuring tissue water content in a region of interest in the brain, the probe comprising:

an implantable tissue water content sensor having two plates with a proximal and distal end, the two plates being separated by a dielectric material and the distal end being implantable in brain tissue;

an impedance matching circuit coupled to the proximal end of one of the plates;

a first output terminal coupled to the matching circuit resistor and a second output terminal coupled to one of the plates;

a remotely positioned frequency spectrum analyzer receiving an output signal from the first and second output terminals; and

a digital computer having a display, the digital computer having an input coupled to the output signal from the water content probe and the spectrum analyzer, the computer programmed to display the resonant frequency of the sensor indicative of water content in the brain tissue.

2. The probe of claim 1 wherein the two plates are coated with insulation material sufficient to provide DC isolation.

3. The probe of claim 1 wherein the impedance matching circuit includes a resistor.

4. The probe of claim 1 further comprising a coaxial cable having a core conductor coupled to the impedance matching circuit and a circumferential conductor coupled to the proximal end of the other plate, the coaxial cable being coupled to the spectrum analyzer.

5. The probe of claim 1 wherein the plates and the dielectric material have a series of transverse holes.

6. The probe of claim 1 further comprising an intracranial pressure sensor located in substantially parallel orientation with the water content sensor and reading the pressure of the region of interest.

7. The probe of claim 6 further comprising:

an analog to digital converter having an output and an input coupled to the intracranial pressure sensor; and

wherein the computer is coupled to the output of the analog to digital converter and is programmed to display simultaneous tracings of apparent water content pulsatility

due to tissue perfusion and compression based on the signal from the spectrum analyzer and the intracranial pressure waveform.

8. The probe of claim 6 further comprising a threaded, self-tapping bolt insertable within a skull aperture, the bolt having a first opening which allows stabilization and positioning of the water content sensor and a second opening which allows stabilization and position of the intracranial pressure sensor.

9. The probe of claim 7 wherein the pressure sensor is a tissue-implanted strain gauge.

10. The probe of claim 7 wherein the pressure sensor is a fiberoptic sensor.

11. The probe of claim 7 further comprising:

a wireless transmitter coupled to the intracranial sensor and the water content sensor; and

a wireless receiver coupled to the digital computer, the receiver tuned to signals from the transmitter.

12. The probe of claim 7 wherein the digital computer determines apparent water content pulsatility due to tissue perfusion and compression by plotting the change in standing wave ratio to the side of the return loss curve on the spectrum analyzer and determines where the standing wave ratio change is at a maximum.

13. The probe of claim 7 further comprising an inductor coupled in parallel to the plates of the water content probe, and wherein the digital computer determines apparent water content pulsatility due to tissue perfusion and compression by plotting the center frequency resonance shift.

14. The probe of claim 11 wherein the impedance matching and transmitter circuit components are an implantable component integrated circuit of the sensor probe.

15. The probe of claim 1 wherein the plates are coupled to a shunt tube which serves as a ventrical drain from the region of interest.

16. A method of measuring tissue water content in a selected region of interest in the brain, the method comprising:

calibrating a capacitive sensor having two plates outside the selected region of interest and determining the resonant frequency of the sensor in air;

calibrating the capacitive sensor in a mixture of water and NaCl,

determining the resonant frequency of the sensor in the mixture;

establishing a linear baseline frequency in relation to water content based on the resonant frequencies of the sensor in air and the mixture;

implanting the capacitive probe through a skull aperture such that the capacitive plates are exposed to the brain cortex and subjacent white matter;

producing interrogatory frequency scanning by a spectrum analyzer coupled to the sensor to determine the center point of resonance by passage of the signal; and

approximating true tissue water content by curve-fitting the frequency of resonance with the baseline frequency.

17. The method of claim 16 further comprising:

measuring the pressure at the selected area; and

interposing the pressure signal to the signal from the spectrum analyzer representing the resonant frequency.

18. The method of claim 17 further comprising:

measuring the lag time in each pulse cycle between peak water content and peak pressure; and

correlating the lag time to brain stiffness.

19. The method of claim 17 further comprising:

deriving a phase angle relationship between peak pressure and water content; and

correlating the phase angle to brain stiffness.

20. The method of claim 16 wherein the two plates are coated with insulation material sufficient to provide DC isolation.

21. The method of claim 16 wherein the capacitative sensor includes a coaxial cable having a core conductor coupled to the resistor and a circumferential conductor coupled to the proximal end of the other plate, the coaxial cable being coupled to the spectrum analyzer.

22. The method of claim 16 wherein the plates have a series of transverse holes.

23. The method of claim 16 further comprising:

inserting a threaded, self-tapping bolt within the skull aperture; and

positioning the sensor within an aperture through the bolt.

24. The method of claim 17 further comprising:

converting the analog signal representing pressure to a digital signal; and

converting the analog signal from the capacitive sensor to a digital signal.

25. The method of claim 16 further comprising:

recording the instantaneous water content and producing interrogatory frequency scanning by a spectrum analyzer coupled to the sensor to determine the center point of resonance by passage of the signal; and

approximating true tissue water content by curve-fitting the frequency of resonance with the baseline frequency to track the water content readings during periodic time intervals.

26. A method of deriving beat-to-beat perfusional and congestion changes in brain tissue, the method comprising:

inserting a water content probe having two conductive plates and a dielectric in the brain tissue;

sending signals at different frequencies on the water content probe;

determining a standing wave ratio at different frequencies; and

determining a water content change tracing which fluctuates with cardiac output pulsatile perfusion of the tissue.

27. The method of claim 26 wherein determining a standing wave ratio is performed using a spectrum analyzer coupled to the water content probe.

28. The method of claim 27 wherein determining a tracing includes:

plotting the change in standing wave ratio to the side of the return loss curve on the spectrum analyzer;

determining where the standing wave ratio change is maximum; and

correlating the standing wave ratio change to a water content change which fluctuates with cardiac output pulsatile perfusion of the tissue.

29. The method of claim 28 wherein the spectrometer has a standing wave ratio setting of about 1.15.

30. The method of claim 27 wherein determining a tracing includes:

plotting the center frequency resonance shift; and

deriving the water content change tracing which fluctuates with cardiac output pulsatile perfusion of the tissue.

31. The method of claim 26 further comprising:

determining the pressure of the area of the brain;

plotting a trace of the pressure which fluctuates with the cardiac output pulsatile perfusion of the tissue;

determining the phase lag between the pressure trace and the water content change tracing; and

determining the relative stiffness of the brain based on the phase lag.

32. The method of claim 26 further comprising:

determining the pressure of the area of the brain;

plotting a trace of the pressure which fluctuates with the cardiac output pulsatile perfusion of the tissue;

determining the time lag between the pressure trace and the water content change tracing; and

determining the relative stiffness of the brain based on the time lag.

33. A method of deriving realtime compliance or stiffness of brain tissue comprising:

measuring the intracranial pressure of the brain tissue;

plotting an intracranial waveform from the measurements of the intracranial pressure;

measuring the pulsatile congestion changes in water content of the brain tissue;

plotting a pulsatile congestion change waveform from the measurements of the pulsatile congestion change;

simultaneously plotting the waveforms of intracranial pressure and the pulsatile congestion change in water content on a computer; and

determining the stiffness of the brain from the simultaneous plotting.

34. The method of claim 33 wherein determining the stiffness includes measuring the lag time in each pulse cycle between peak water content and peak pressure wherein lower lag time indicates severe stiffness or abnormal compliance and widened lag time relates to a relaxed brain.

35. The method of claim 33 wherein determining the stiffness includes:

deriving a phase angle relationship between peak pressure and water content;

adjusting for heatbeat frequency; and

wherein a smaller phase angle indicates severe stiffness or abnormal compliance and larger phase angle relates to a relaxed brain.

36. The method of claim 33 further comprising converting the pressure and water content waveform from an analog to a digital waveform.

37. The method of claim 33 further comprising:

obtaining a derivation of an indicator of realtime compliance by utilizing a transducer to measure local tissue fluctuation; and

measuring a relationship to the intracranial pressure sensor waveform.

38. The method of claim 37 wherein the transducer is a heat clearance sensor.

39. The method of claim 37 wherein the transducer is a laser Doppler sensor.

40. The method of claim 33 wherein measuring the intracranial pressure of the brain tissue is performed by a tissue-implanted strain gauge.

41. The method of claim 33 wherein measuring the intracranial pressure of the brain tissue is performed by a tissue-implanted strain gauge fiberoptic sensor.

42. The method of claim 33 wherein measuring the intracranial pressure of the brain tissue is performed by an external strain gauge coupled via tubing to a ventriculostomy catheter.

43. A probe for measuring tissue water content in a region of interest in the brain, the probe comprising:

an implantable tissue water content sensor having two plates with a proximal and distal end, the two plates being separated by a dielectric material and the distal end being implantable in brain tissue;

a signal transmitting circuit coupled to the proximal end of one of the plates;

a signal receiver;

a remotely positioned frequency spectrum analyzer coupled to the signal receiver; and

a digital computer having a display, the digital computer having an input coupled to the output signal from the water content probe and the spectrum analyzer, the computer programmed to display the resonant frequency of the sensor indicative of water content in the brain tissue.

44. The probe of claim 43 wherein the transmitter circuit includes an inductor and the signal receiver includes a second inductor wherein magnetic field energy is applied to the second inductor.